FACILITY SOIL AND VEGETATION SAMPLING

Purpose

This Meteorology and Air Quality Group (MAQ) procedure describes the process for collecting soil, sediment, and vegetation samples from Material Disposal Area G (Area G) at TA-54, the Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility at TA-15, and the Plutonium Facility at TA-55 as part of the Soil Monitoring Program, as mandated by DOE Order 450.1.

Scope

This procedure applies to the individual(s) assigned to collect samples from the facilities as part of the Facility Monitoring Program in MAQ.

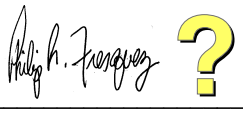
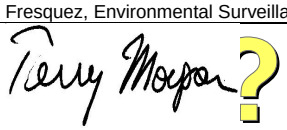
In this procedure

This procedure addresses the following major topics:

Hazard Control Plan

The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **low**. Residual risk = **low.** Work permits required: none. First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Signatures

Prepared by:  Phil Fresquez, Environmental Surveillance Team Leader	Date: 5/12/04
Approved by:  Terry Morgan, QA Officer	Date: 5/12/04
Work authorized by:  Jean Dewart, MAQ Group Leader	Date: 5/14/04

05/24/04

General information about this procedure

Attachments

This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	2
2	Environmental Surveillance Team Chain-of-Custody Record	1
3	Soil Sampling Equipment and Diagram	3

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	10/4/96	New document.
1	3/99	Reformatted in accordance with LIR300-00-01, Safe Work Practices.
2	4/01	Added new Section 9.0, Training.
3	4/02	Change in directorate.
4	4/03	Team name change to Environmental Surveillance.
5	5/12/04	Updated and reformatted document to conform with MAQ procedures.

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- MAQ personnel assigned to collect samples

Training method

The training method for this procedure is **on-the-job** training by a previously-trained individual and is documented in accordance with the procedure for training (MAQ-024).

Annual retraining is required and will be by self-study (“reading”) training.

Prerequisites

In addition to training to this procedure, the following training is also required prior to performing this procedure:

- First Aid
- Cardiopulmonary Resuscitation (CPR)
- MAQ-Field, “General Field Safety for All Employees”

General information, continued

Definitions specific to this procedure

Soil: Surface soil includes material from the 5-cm (0- to 2-in.) depth.

Composite sample: Samples composed of the five sub-samples taken from an area.
Grab samples: A single sample taken from a specific location at a given point in time.

Sediments: Surface runoff material from ephemeral and perennial stream bottoms.

Vegetation: Top growth material of plants.

References

The following documents are referenced in this procedure:

- MAQ-024, "Personnel Training"
- MAQ-026, "Deficiency Reporting and Correcting"
- MAQ-706, "Processing and Submitting Samples"
- MAQ-Field, "General Field Safety for All Employees"

Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Worker Safety

Precautions and limitations

This document establishes the basic requirements for collecting soil samples. Work performed under this procedure by LANL personnel will occur only after required training to applicable documents has been completed and documented.

Safe work practices requirements

Project Personnel - A minimum of two people is required to go out in the field.

Personal Protective Equipment - For sampling, the following personal protective equipment must be worn: safety glasses, safety/field shoes, rubber gloves, and a hat.

Do not perform work under conditions you consider unsafe. Before beginning work described in this procedure, review safety needs and requirements, identify hazards, and develop hazard mitigation measures.

Sample Collection

Sampling information

Types of Samples Collected - Sampling occurs at three sites, Area G (TA-54), DARHT (TA-15), and the Plutonium Facility (TA-55), where three types of samples are collected:

- soil,
- sediments, and
- vegetation: understory (grasses, forbs, and/or shrubs) and overstory (tree).

Number of samples

The following table indicates the number of composite (c) or grab (g) samples that should be collected from each area. These numbers may vary according to funding provided by the customer. Drought conditions may also reduce the number of vegetation samples that can be collected.

	TA-54	TA-15	TA-55
Soil	9 (c)	4 (c)	4 (c)
Sediment	N/A	4 (g)	
Vegetation	19 (c)	8 (c)	4 (c)

Equipment needed

Additional specific equipment required for going into the field is given in the operating procedure “General Field Work” (RRES-MAQ-Field).
The following equipment is required for all sampling:

- safety glasses
- rubber gloves
- tape measure
- permanent marker for labeling
- ice chest with blue ice
- zip-lock bags (gallon size)
- chain-of-custody forms (Attachment 2), tape

Additional equipment needed for each medium in addition to the above

Soil Sampling

- stainless steel soil ring (10-cm diameter), top, and ring-spatula
- 3-lb hammer
- soap/water solution (for washing ring), water (rinsing), paper towels
- 500-mL & 125-mL polyethylene bottles (1 for each composite sample)

Sediment Sampling

- disposable polyethylene scoops
- 500-mL & 125-mL polyethylene bottles (1 for each composite sample)

Vegetation Sampling

- gardening shears

Sample Collection, continued

Before leaving for the field

Check the condition of the vehicle and the fuel level. Identify a Point-of-Contact (providing pertinent information of destination, expected time-in, and how to notify field team). When leaving Los Alamos County, notify the group office to place you on travel status. Ensure that you have a working cell phone and a pager.

Steps for sampling soil

Sampling guidelines set by the American Society for Testing and Materials (ASTM) were used to develop the guidelines followed by the Environmental Surveillance Team. Each year, plan trips to facility sampling locations and perform the following steps:

Step	Action
1	Locate the center of the sampling area, and place a clean 10-cm (4-in.) diameter stainless steel ring on the surface (see Attachment 3). Cover the ring with the stainless steel top.
2	Using a 3-lb hammer, drive the stainless steel ring 5 cm (2.0 in.) deep into the ground at the center and corners of a square area, 10-m (33-ft) per side. After driving the ring-sampler at each point, remove soil next to the soil ring-sampler, slip the spatula underneath the ring, and lift the sample. Place each of the five sub-samples into a 1-gallon zip-lock bag.
3	Thoroughly mix the sub-samples in the zip-lock bag to form a composite sample. Pour the composite into a 125-mL polyethylene bottle (for heavy-metal analysis) and a 500-mL poly bottle (for radionuclide analysis).
4	Seal each bottle with chain-of-custody tape. Label the bottle with the sample location, date, time, and your initials. Place each bottle into a 1-gallon zip-lock bag and then into ice chest.
5	Complete a chain-of-custody form (Attachment 2) with the appropriate sampling information. Maintain proper chain-of-custody on the samples. See chapter *Chain-of-custody for samples*.
6	Wash ring, spatula, and top with the soap/water solution, rinse with water, and then dry with paper towels.
7	Once at the Lab, store the samples on ice or in a freezer until samples are shipped to the analytical laboratory (normally within two working days). Follow preparation and processing methods described in MAQ-P706 (*Processing and Submitting Samples*).

Sample collection continued on next page.

Sample Collection, continued

Steps for sampling sediments

To collect sediment samples, perform the following steps:

Step	Action
1	Locate the sampling areas. Using a disposable polyethylene scoop, collect sediments to a depth of 5 cm (2 in.) in both a 125-mL (for heavy metal sampling) and a 500-mL (for radionuclide sampling) polyethylene bottle. • perennial streams: sample in dune buildup behind boulders in the main channel • ephemeral streams: sample in the center of the main channel
2	Seal each bottle with chain-of-custody tape. Label the bottle with the sample location, date, time, and your initials. Place each bottle into a 1-gallon zip-lock bag.
3	Place the bags in the cooler with ice for transport back to the laboratory. Complete a chain-of-custody form (Attachment 2) with the appropriate sampling information. Maintain proper chain-of-custody on the samples. See chapter *Chain-of-custody for samples*.
5	Once at the lab, store the samples on ice or in a freezer until samples are shipped to the analytical laboratory (normally within two working days). Follow preparation and processing methods described in MAQ-P706 (*Processing and Submitting Samples*).

Sample collection continued on next page.

Sample Collection, continued

Steps for sampling vegetation

To collect vegetation samples, perform the following steps:

Step	Action
1	Collect approximately three pounds of vegetation and place into a zip-lock bag. Label the bag with the sample location, date, time, and your initials.
2	Place the bags in the cooler with ice for transport back to the Laboratory. Complete a chain-of-custody form (Attachment 1) with the appropriate sampling information. Maintain proper chain-of-custody procedures for samples until they are shipped to the analytical laboratory. See chapter *Chain-of-custody for samples*.
3	Once at the Lab, store the samples on ice or in a freezer until samples are processed (normally within two working days). Follow preparation and processing methods described in MAQ-706 (*Processing and Submitting Samples*).

Chain-of-custody for samples

Maintaining custody of samples

A sample is physical evidence collected from a facility or the environment. Chain-of-custody must be documented for all samples used to demonstrate compliance. Verify that the possession and handling of samples is traceable at all times. A sample is considered in custody if it is one of the following:

- In one's physical possession.
- In one's view after being in one's physical possession.
- In one's physical possession and then locked up so that no one can tamper with it.
- Kept in a secure area where access is restricted to authorized and accountable personnel only.

NOTE: A secured area is an area that is locked, such as a room, cooler, vehicle, or refrigerator. If the area cannot be secured by locking, use a custody seal to secure the area or the sample container.

Transferring custody of samples

Whenever samples are transferred into the custody of another person or organization, complete the "relinquished by/received by" and "date" sections of the form (Attachment 2). These sections of the form must provide a complete history of custody of the samples from collection to transfer to the analytical laboratory.

If chain-of-custody is broken

Whenever there is a break in the chain of custody of a sample, document the failure by initiating a deficiency report in accordance with the procedure for deficiencies (MAQ-026). [The deficiency process will document the occurrence, evaluate the potential impact (if any) on the samples, and propose a fix to prevent recurrence.]

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted **within one year** as records to the records coordinator:

- Chain-of-Custody record

HAZARD CONTROL PLAN

1. The work to be performed is described in this procedure.
"Facility Soil and Vegetation Sampling"

2. Describe potential hazards associated with the work (use continuation page if needed).

Sampling of waste sites
Falls/tripping—uneven terrain, carrying awkward objects or equipment
Animal Injuries (snakes, spiders, mountain lions, etc.)
Weather—Lightning
Handling heavy objects (loading/unloading/transporting/postioning)
Ergonomic injuries (repetitive motion)
Hammering injury (smashed fingers) & flying debris
Shears and clippers

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01, section 7.2)

Sampling at waste sites—remote/negligible = minimal
Falls/tripping—occasional/moderate = low
Animal Injuries (snakes, spiders, mountain lions, etc.)—remote/critical = minimal
Weather—Lightning—remote/catastrophic = low
Handling heavy objects (loading/unloading/transporting/postioning)—improbable/moderate = minimal
Ergonomic injuries (repetitive motion)—remote/negligible = low
Hammering injury (smashed fingers) & flying debris—moderate/occasional = low
Shears and clippers—improbable/moderate = minimal

Overall *initial* risk: ☐ Minimal ☒ Low ☐ Medium ☐ High

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:
☐ None ☒ List: Work Permits required? ☒ No ☐ List:

LIR-402-706-01 "Personnel Dosimetry"
Facility-specific training for Area G
Access control check-in required for DARHT

HAZARD CONTROL PLAN, continued

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

Sampling at waste sites—The following safety/personal protective equipment will be worn: LEVEL 4 PPE (safety glasses, safety/field shoes, rubber gloves, and a hat).
Falls/tripping – Read the "Field Safety for All" document on awareness of trips, slips, and falls.
Animal Injuries – Read the "Field Safety for All" document and use common sense to avoid these types of injuries.
Weather (lightning) -- Read the "Field Safety for All" document and seek shelter when necessary.
Handling heavy objects (loading/unloading/transporting/postioning)--Use proper lifting techniques.
Ergonomic injuries (repetitive motion)—Take a short break every hour.
Hammering injury (smashed fingers) & flying debris—Wear protective clothing: gloves and safety glasses.
Shears and clippers—Use care when cutting and wear protective (Kevlar) gloves.

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):

☒ Group-level orientation (per MAQ-032) and training to this procedure.
☒ Other → See training prerequisites on procedure page 3. Any additional describe here:

7. Any wastes and/or residual materials? (check one) ☒ None ☐ List:

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01, section 7.3.3) is (check one):

☐ Minimal ☒ Low ☐ Medium (requires approval by Division Director)

9. Emergency actions to take in event of control failures or abnormal operation (check one):

☐ None ☒ List:

For all injuries, provide first aid and see that injured person is taken to Occupation Medicine (only if immediate medical attention is not required) or the hospital.

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

Preparer(s) signature(s)	Name(s) (print) /Position	Date

Signature by group leader on procedure title page signifies authorization to perform work for personnel properly trained to this procedure. This authorization will be renewed annually and documented in ESH-17 records. Controlled copies are considered authorized. Work will be performed to controlled copies only. This plan and procedure will be revised according to MAQ-022 and distributed according to MAQ-030.

MAQ, Meteorology and Air Quality

Environmental Surveillance Team Chain-of-Custody Record

This form is from MAQ-711

Project Contact _____

Contact Phone No. _____ **MS**_____

Project Name Facility Sampling
Soils, sediments, and vegetation

_____

_____

Account Code _____

Cost Center _____

Program Code _____

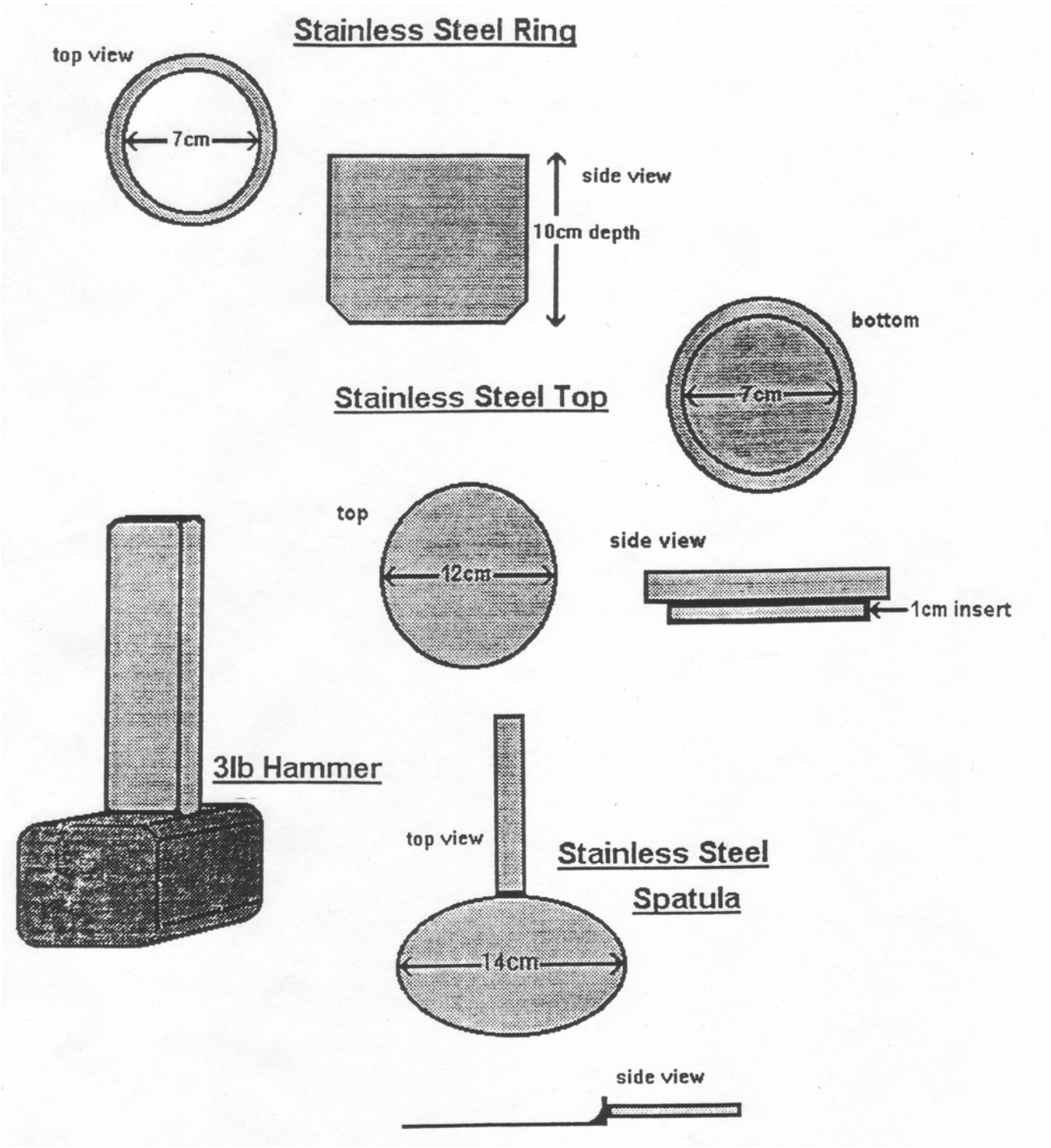
Date Collected	Time Collected	Station Name/Number	Number of Samples	Analysis Requested	Remarks

Relinquished by (print and sign)	Date	Relinquished by (print and sign)		Relinquished by (print and sign)	
			Date		Date
	Time		Time		Time
Received by (print and sign)		Received by (print and sign)		Received by (print and sign)	
	Date		Date		Date
	Time		Time		Time

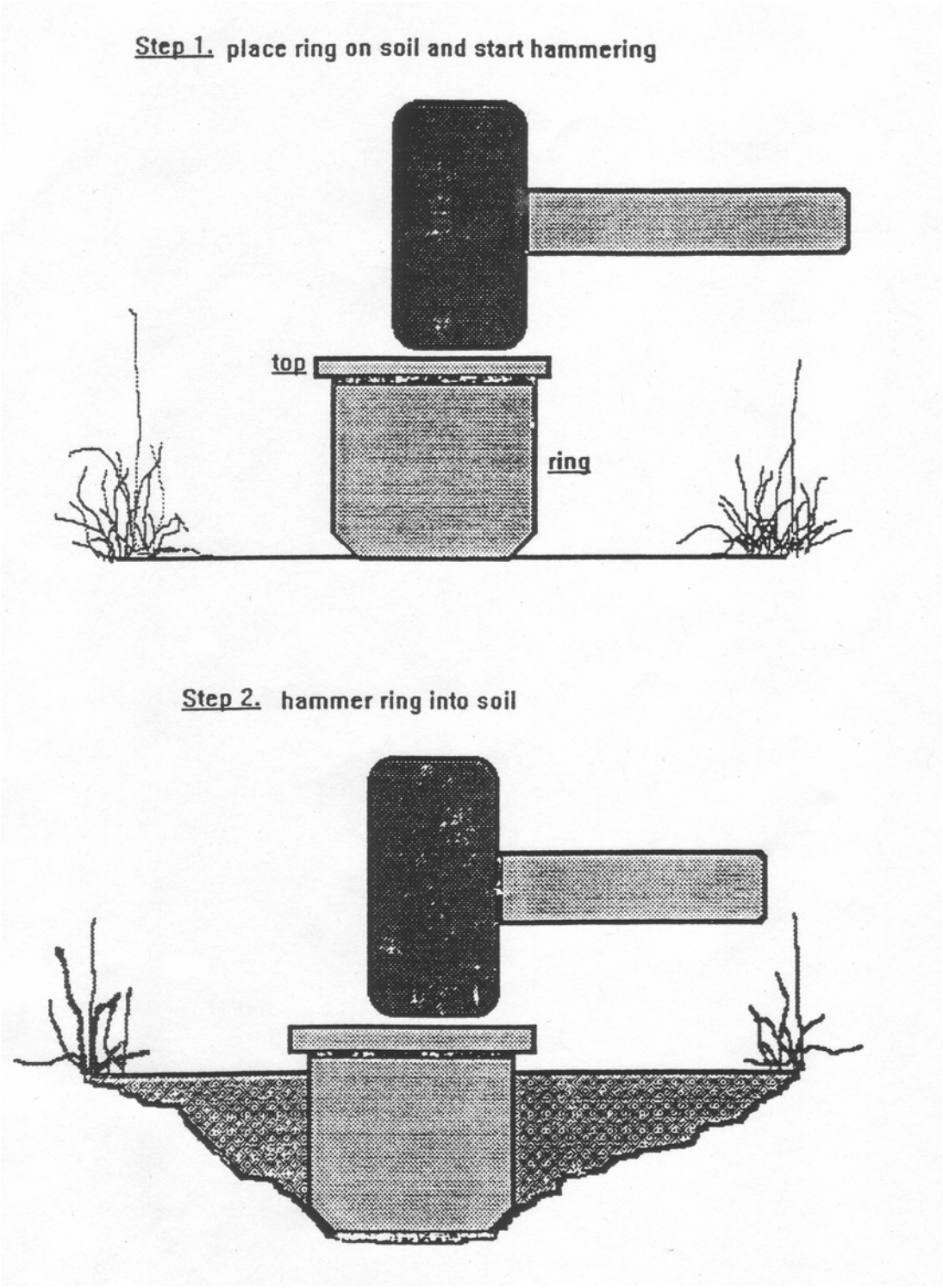
Samplers (print names and initial) _____

Comments

Soil Sampling Equipment and Diagram



Soil Sampling Equipment and Diagram, Continued



Reviewed by:

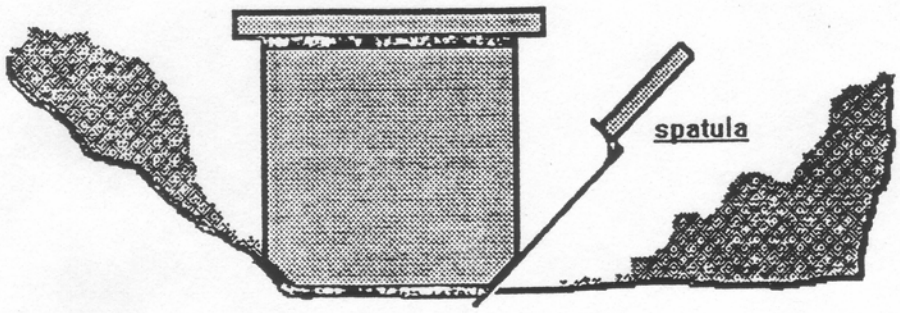
_____

Date:

_____

Soil Sampling Equipment and Diagram, Continued

Step 3. remove soil from surrounding of ring with spatula



Step 4. remove ring from soil with spatula and place soil into a sampling bag